REMARKS

Claim 17 was objected to because of depending from a canceled claim. Accordingly, Claim 17 has been amended to now depend from independent Claim 14. As such, withdrawal of the objection is earnestly solicited.

Claims 21-23 have been added without introducing new matter.

Claim Rejections - 35 U.S.C. §103

Claims 1-14 and 17-20 were rejected, under 35 U.S.C. §103, as being allegedly obvious over US Patent No. 5,903,718 (hereinafter Marik) in view of US Patent No. 6,366,878 (hereinafter Grunert). Applicants respectfully traverse in view of the following.

Independent Claim 1 recites a limitation whereby a breakpoint lookup table is associated with the virtual microcontroller with a break bit associated with each of a plurality of instruction addresses, as claimed. Accordingly, each of the plurality of instruction addresses has an associated break bit regardless of whether a break is to occur. Additionally, independent Claim 1 recites a limitation whereby a breakpoint controller sends a break message, as claimed.

In contrast, Marik discloses a method for enabling and disabling debug features (e.g., breaking) (see Marik, col. 6, lines 48-51). Marik further discloses that interrupt from the target system code to the interrupt handler debug routine is called "debugpoint" and that a table contains a record for each specified

debugpoint in the target system (see Marik, col. 6, lines 51-55). Therefore, Marik discloses a table containing only information regarding interrupts associated with the target system. According, the table in Marik fails to include break bits associated with instruction addresses where no break is to occur. Therefore, Marik fails to teach or suggest a break bit associated with each of a plurality of instruction addresses, as claimed.

Moreover, Marik discloses that the microcontroller has an interrupt input (see Marik, col. 2, line 27) and that when the system under test receives one or more debugger signals as an interrupt input, the microcontroller executes a debugger program (see Marik, col. 2, lines 33-36). Marik discloses that a microcontroller receives a debugger signal as an interrupt input but it fails to explicitly teach or suggest a breakpoint controller sending a break message, as claimed.

The Office Action recites Marik (column 14, lines 19-35) to show the breakpoint controller that sends a break message to the microcontroller whenever an instruction address is encountered that is associated with a set break bit, as claimed. The Applicants, however, do not understand the disclosed portion of Marik to correspond to what has been quoted by the Examiner. Accordingly, clarification in the next Office Action is requested if the rejection is maintained.

The rejection admits that Marik fails to disclose a virtual microcontroller operating in lock-step synchronization with the microcontroller by virtue of their identical operation, as claimed. The rejection relies on Grunert to remedy Marik's failure. The Applicants respectfully traverses in view of the following.

Marik discloses that "what is needed is a debugging method and system that performs the emulator debugging functions on an off-the-shelf microcontroller in place in the system under test without the need for in-circuit emulator technology" (see Marik, col. 2, lines 13-17). Additionally, Marik discloses a method and system using a microcontroller for self-debugging (see Marik, col. 2, lines 24-25). In contrast, Grunert is a circuit arrangement for in-circuit emulation of a microcontroller (see Grunert, Title) to reduce the outlay for providing a microcontroller suitable for in-circuit emulation (see Grunert, col. 1, lines 35-36). Therefore, the motivation for Marik is to eliminate in-circuit emulator technology whereas the motivation for Grunert is to reduce the outlay for providing a microcontroller suitable for in-circuit emulation. Accordingly, the addition of Grunert to Marik renders Marik inoperable and the addition of Marik to Grunert renders Grunert inoperable. Accordingly, the cited references are incapable of the asserted combination.

Additionally, Marik teaches away the recited limitations of independent Claim 1 because Claim 1 is directed to an in-circuit emulation system, as claimed whereas Marik is directed to a debugging method and system without in-circuit emulation technology.

Accordingly, Marik alone or in combination with Grunert fails to teach or suggest the recited limitations of independent Claim 1 and in fact teaches away from the recited limitations. Moreover, combining the cited combination renders each of the cited references inoperable. As such, independent Claim 1 is not rendered obvious, under 35 U.S.C. §103, over the cited combination. Independent Claims 7 and 14 recite limitations similar to that of independent Claim 1 and are unptentable, under 35 U.S.C. §103, over the cited combination for the same reasons that independent Claim 1 is patentable. Dependent claims are patentable by virtue of their dependency. As such, allowance of Claims 1-14 and 17-23 is earnestly solicited.

For the above reasons, the Applicants request reconsideration and withdrawal of the rejections under 35 U.S.C. §103.

CONCLUSION

In light of the above listed remarks, reconsideration of the rejected Claims is requested. Based on the arguments presented above, it is respectfully submitted that Claims 1-14 and 17-23 overcome the rejections of record and, therefore, allowance of Claims 1-14 and 17-23 is earnestly solicited.

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Respectfully submitted,
WAGNER, MURABITO & HAO LLP

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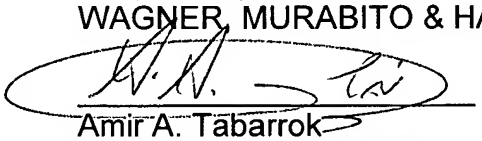

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